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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,542	01/23/2006	Oliver Huttenloch	283044US0PCT	2085
22850	7590	04/02/2009	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			CUTLIFF, YATE KAI RENE	
			ART UNIT	PAPER NUMBER
			1621	
			NOTIFICATION DATE	DELIVERY MODE
			04/02/2009	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/565,542	<b>Applicant(s)</b> HUTTENLOCH ET AL.	
	<b>Examiner</b> YATE' K. CUTLIFF	<b>Art Unit</b> 1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                            |                                                                                         |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 1 - 20 are pending.  
Claims 1 - 20 are rejected.

### ***Response to Amendment***

2. The amendment to claim 1, submitted November 26, 2008 is acknowledged and entered.

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection, as set out below.

### ***Claim Objections***

4. Claim 1 is objected to because of the following informalities: in line 23 the term "present" is misspelled. Appropriate correction is required.
5. Claim 2 is objected to because of the following informalities: in line 3 the term "alkyl" is misspelled. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leppard et al. (US 6,888,031) in view of Livingston (US 2,642,344) and further in view of Stuebinger et al. (US 3,723,536).

10. The rejected claims cover, inter alia, a process for preparation of acylphosphines of formula (I) where m, R1, R2, R3 are as defined in claim 1; by reacting an organic phosphorus halide of formula (II) with Y as defined in claim 1; with sodium in a solvent in the presence of an activator and the sodium is pre-sent in the form of a dispersion of sodium particles of a mean particle size less than or equal to 500  $\mu\text{m}$  in the solvent;

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subsequent reaction with an acid halide of formula (III); and the process is carried out without isolation of the intermediate; and the activator is selected from the group consisting of n-butanol, aromatic chlorohydrocarbons, aliphatic chlorohydrocarbons, aromatic bromohydrocarbons, aliphatic bromohydrocarbons, and combinations thereof.

Dependent claim 2, further limits R1, R2 and R3 to be independent from each other phenyl, naphthyl and biphenyl, and being unsubstituted or substituted by one to five halogen, C1-C8 alkyl and/or C1-C8 alkoxy. With claim 3 limiting R1 and R3 to phenyl and R2 to 2,4,6,-trimethylphenyl.

Dependent claims 4, 10 and 11 identify the activator as chlorobenzene and/or n-butanol or combination thereof. Dependent claim 9 identifies the solvent. Dependent claims 5, 12, 13 and 14 disclose that the sodium is dispersed via a high speed turbine stirrer. Dependent claims 6, 15, 16, 17 and 18 disclose the atom equivalents for the sodium. Dependent claims 7, 8, 19 and 20 identify the reaction temperatures.

11. Leppard et al. teaches the process for making acylphosphines having a formula (I) by reacting a phosphorous halide of formula (II) with an alkali metal or with magnesium in combination with lithium, or with mixtures thereof, where appropriate in the presence of a catalyst; and subsequent reaction with an acid halide for formula (III); and wherein the process is carried out without isolation of the intermediates. The R substituents, Y substituents, m and n are identically defined as in Applicant's claimed invention. (see columns 1,2 & 3). Further, the process for preparing the mono- and bisacylphosphines, an organic phosphorus halide (II) is first reacted with an alkali metal, a metalized phosphine (IIa) is formed via different intermediary steps. (see column 5,

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lines 62-66). The alkali metal used in the intermediate step can be sodium which is employed in atom equivalents from 4 to 6 or 2 to 3. (see column 6, line 11-23). The reaction is carried out in a solvent, which may be ethers. (see column 6, lines 31-36). The reaction temperature ranges from -20°C to +120°C. (see column 6, lines 37-38). The catalyst (activator), if used, can be an aromatic hydrocarbon without heteroatoms. (see column 6, lines 39-44).

The difference between Applicant's claimed process and Leppard et al. is that the reference does not disclose the following: that the sodium in a solvent in the presence of an activator is in a dispersion; that the activator is a group consisting of n-butanol, aromatic chlorohydrocarbons, aliphatic chlorohydrocarbons, aromatic bromohydrocarbons, aliphatic bromohydrocarbons, and combinations thereof; the particulate size of the sodium particles; the use of solvents such as toluene and/or ethyl benzene and the use of a high speed stirrer.

12. However, with regards to the sodium being suspended, Leppard et al. recognized the use of suspending the metals in a solvent as demonstrated by Examples 1- 12 and 14, where lithium is suspended in tetrahydrofuran (THF) (an ether). Additionally, Leppard et al. recognized the use of an activator for the suspended metal as demonstrated in Examples 1-12 and 14, where the suspended lithium in THF is charged with naphthalene. Therefore, since sodium is one of the metals useful for the process of Leppard et al., it would be within the purview of one skilled in the art at the time of the claimed process to substitute sodium metal for lithium in the process of Examples 1-12 and 14 of Leppard et al.

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13. Furthermore, with regards to the differences such as type of solvents and activators suitable for the dispersion agent of metal sodium, and high speed stirring; the Examiner turned to the teachings of Livingston. The Livingston reference discloses alkali metal dispersions and the fact that the suspended alkali metals can be used as a source of metal in carrying out chemical reactions. (see column 2, lines 38-40).

Livingston discloses that dispersion agents can be hydroxy compounds such as n-butanol. (see column 3, lines 56-59). Additionally, the sodium and agent are added in a vessel with a pump run at 800 to 900 R.P.M. and at the end of the agitation the dispersion contained sodium particles less than 100 microns ( $\mu\text{m}$ ). (see Example 1 & column 1, lines 20-25). Specifically, the references states that any device can be used for agitation, especially those designed such that a large amount of shear and turbulence are created. (see column 10, lines 35-41). Livingston discloses that other dispersing agents include other inert oils such a xylene (an aromatic hydrocarbon), or any liquid with which sodium does not react and which has a boiling point above the melting point of sodium would be a suitable dispersing agent. (see column 5, lines 69-72 & column 10, lines 46-73). Lastly, according to Livingston, the disclosed dispersing agents may be used in conjunction with other dispersing agents. (see column 9, line 75 to column 10 lines 1-2).

14. Leppard et al. nor Livingston discloses the use of aromatic chlorohydrocarbons, aliphatic chlorohydrocarbons, aromatic bromohydrocarbons, aliphatic bromohydrocarbons, and combinations thereof; and the use of solvents such as toluene and/or ethyl benzene.

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15. However, Stuebinger et al. discloses a process for the production of triaryl phosphines that uses a dispersion of alkali metal with an organic solvent. (see abstract). The alkali metal is sodium and can have a particle size ranging from 0.01 mm (10 microns) to 5 mm (5000 microns). (see column 2, lines 21-23). The alkali metal can be disbursed in organic solvents such as, aliphatic, cycloaliphatic or aromatic hydrocarbons. The aromatic solvents can be toluene or benzene. Other suitable solvents are ethers such as tetrahydrofuran. (see column 3, lines 4-13). Additionally, the process of Stuebinger et al. adds an aryl halide to the organic solvent in preparation for the dispersion, where the aryl halide is identical to the aryl halide used in the reaction process with the phosphorus halide. (see column 2, lines 26-33). The aryl halides used in Stuebinger et al. are aryl chlorides and aryl bromides such as, chlorobenzene, bromobenzene, chlorotoluenes etc. (see column 2, lines 1-13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a dispersion of sodium prepared as suggested by Livingston et al. in view of Stuebinger et al. in the process of Leppard et al.; since sodium dispersion when used as a reagent is in a solvent or other dispersion agents and those dispersion agents can be interchanged. The particle size of the sodium in dispersion, as taught by both Livingston et al. and Stuebinger et al, is usually less than 500  $\mu\text{m}$ . Further, Leppard teaches that the process for preparing the acylphosphines includes an intermediary step that reacts with organic phosphorus halide with an alkali metal such as sodium in the process for preparing acylphosphines. The skilled artisan would be motivated to utilize the sodium dispersion techniques of Livingston or Stuebinger et al.



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in the process of Leppard et al. since it is known that the intermediary step is required, and the technique disclosed by Leppard et al. allows one to utilize sodium dispersion with an aromatic hydrocarbon activator to make the acylphosphines.

In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35 USC 103(a). From the teachings of the references, it is apparent that one of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common senses. Therefore, the invention as a whole was *prima facie* obvious because a person of ordinary skill in the art at the time the invention was made, would have been motivated to combine the prior art to achieve the claimed invention and that there would have been a reasonable expectation of success.

With regard to the use of aliphatic chlorohydrocarbons, or aliphatic bromohydrocarbons, this use is deemed to be within the purview of the ordinary artisan to modify the activator within a known reaction process. Specifically, because the teaching of Stuebinger et al. asserts the importance of using a hydrocarbon with a monohalide radical that is identical to the halide radical of the reactant in order for the reaction to proceed. Applicant's claimed process uses halide radicals of Br or Cl for Y, and the radicals are identical in the reactants of formula (II) and formula (III). The halide the radicals for the aliphatic hydrocarbons used in Applicant's activator are Br and Cl. Applicant's use of identical halide radicals in the reactants and the activator are in line

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with the teachings of Stuebinger et al. Therefore, these limitations are deemed obvious absent a showing of unexpected results.

A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill in the art might reasonably infer from the teachings. (*In re Opprecht* 12 USPQ 2d 1235, 1236 (Fed Cir. 1989); *In re Bode* 193 USPQ 12 (CCPA) 1976). Applicant is reminded: "the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference .... Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871,881 (CCPA 1981). See also *In re Sneed*, 710 F.2d 1544, 1550, 218 USPQ 385, 389 (Fed. Cir. 1983) ("[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review.").

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YATE' K. CUTLIFF whose telephone number is (571)272-9067. The examiner can normally be reached on M-TH 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel M. Sullivan can be reached on (571) 272 - 0779. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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